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CHEMISTRY STUDENT WORKSHEET WITH SETS (SCIENCE TECHNOLOGY ENVIRONMENT SOCIETY) ORIENTED TO COLLOID TOPIC FOR RSMABI

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Abstrak. Penelitian ini dilakukan untuk mengetahui kelayakan *Chemistry Student Worksheet* Berorientasi SETS Pada Materi Pokok Koloid untuk RSMABI berdasarkan penilaian oleh dosen kimia, guru kimia, ahli bahasa, dan ahli media terhadap kriteria isi penyajian, kebahasaan, graphity dan kesesuain dengan komponen SETS. Rancangan penelitian ini menggunakan modifikasi yang mengacu pada model 4-D (*four D models*) oleh Thiagarajan, tetapi hanya terbatas pada tahap *develop*. Instrumen yang digunakan adalah lembar telaah dan lembar validasi. Hasil penelitian menunjukkan bahwa *Chemistry Student Worksheet* Berorientasi SETS yang dikembangkan telah layak digunakan dalam proses pembelajaran untuk RSMABI karena telah memenuhi kriteria isi, penyajian, kebahasaan, kegrafikaan, dan kesesuain dengan komponen SETS masing-masing dengan persentase berturut-turut sebesar 82,52%, 83,44%, 87,50%, 94,64 % and 85,94%.

Kata Kunci: *Chemistry student worksheet, SETS, Koloid, kelayakan.*

Abstract. This research has been done to know the feasibility of Chemistry Student Worksheet with SETS Orientation to colloid Topic For RSMABI, based on assessment by Chemistry lecturer, Chemistry teacher, specialist of language, and media specialist about feasibility criteria for contents, presentation, language, graph and suitability of SETS components. Device of Research relate at modification of four D (4-D) models by Thiagarajan but it is limited in develop step. Instruments That are used sheet review sheet and validity. The results showed That of Chemistry Student Orientation Worksheet with SETS have been developed competent used in the learning process for RSMABI has since met feasibility criteria for contents, presentation, language, and suitability of SETS graph components, each with a row percentage of 82.52 %, 83.44%, 87.50%, 94.64% and 85.94%.

Key words: Chemistry Student Worksheet, SETS, colloids, feasibility.

INTRODUCTION

Globalization era is characterized by very strong competition in the technology sector and human resources. Related to this, the Government of Indonesia has the responsibility to develop the management system and use its authority to prepare human resources to excel through the national education system reform. Law of the Republic of Indonesia Number 20 Year 2003 on National Education System is a legal basis and implementation of the national education system reform. Article 50, paragraph 3 states that "the Government and / or local governments conduct at least one unit of education at all levels of education to be developed into an international educational unit". Implementation of the Act is the program's international school stubs (RSBI) [1].

In the implementation of the Pioneer High School International Standard (RSMABI) there are three stages, the stages of development and empowerment of schools to develop curriculum in Indonesian and English. At the stage of independent schools are expected to develop bilingual teaching into learning English entirely. Lessons are conducted using English for the group Science (Chemistry, Physics,

Biology) and Mathematics in the Department of Science [1].

Based on the Ministry of Education in the implementation of the program there RSMABI components that must be considered one of them is the development of curricula (SBC), which also mentions that the teaching materials that can be used one of them is a student activity sheet (student work-sheet). According to the Ministry of Education there are a number of reasons why it is necessary to menembangkan materials such as: availability of materials as demanded by the curri-culum, characteristics of the target, and learn problem-solving demands [2].

It is known that the school has used in teaching chemistry student worksheet, but in some schools RSMABI student worksheet that is used in teaching chemistry class XI was speaking particularly Indonesia, as in SMAN 1 Manyar Gresik, 2 Kediri SMAN, SMAN 1 Cerme Gresik, SMAN 1 Situbondo, SMAN 1 Probolinggo, SMA Muhammadiyah 2, SMAN 1 Sidoarjo. It is also evident from the results of interviews with high school chemistry teacher at School 1 Pamekasan which is dated March 19, 2011 RSBI known that the chemical study of learning resources is one of the student worksheet that is used is still using the Indonesian language. Though this year is the 4th year SMA Negeri 1 Pamekasan be RSBI which meant a longer school year to the independent stage.

The curriculum used in the curriculum RSMABI enriched curri-culum with international standards such as the Cambridge curriculum. Curri-culum related to the exercise of SBC stated that the formulation based on these principles: 1) centered on the potential, development, needs, and interests of learners and the environment (environment), 2) responsiveness to knowledge (science), technology (technology), and 3) relevant to the needs of life (society) [3]. According to a senior high school chemistry teacher Pamekasan states have not fully connect with the science of chemistry lessons, evironment, technology and society (SETS) is implicit in the principles of the curriculum. Based on the results of a questionnaire distributed on March 19, 2011 to 25 student questionnaire results 94% of students expressed the need to link the chemical to the environment of learning, technology, and society.

As 60% of students stated that the subject matter of colloids can be attributed to the environment, techno-logy, and society. This is also confirmed by high school chemistry teacher class XI 1 Pamekasan Affairs stating that the subject matter is a colloidal form of reading material and concepts. Sub mission of this material at the end of the second half of the semester exams approaching, so usually the students were told to read on their own and do the questions in the student worksheet. Chemistry teacher is expected that the problems in the student worksheet can be attributed to real people's lives, and can be associated with the learning environment so that the colloids can be meaningful to students. According to the contents BSNP Competency Standards in Colloid material is explained and the properties of colloidal systems and their application in daily life. Basic competence in subject matter that is making various colloid colloidal systems with the materials around them and classify the properties of colloids and their application in daily life [4]. Basic competence is adjusted with the IGCSE curriculum Cambridge A-Level.

SETS approach is a form of learning activities that are reciprocal linking elements of science, environ-ment, technology and society. SETS approach not only emphasizes the knowledge of science concepts, but also connect the concepts of science to the environment around the student, emerging technologies and state of society around students [5].

Colloidal material in relation to the environment, technology and society is perfect as seen from the standard of competence and the competence of the colloidal material is essentially involve concepts of science in everyday life can be assessed either with the environment, in technology and in people's lives. With SETS approach is expected that students can understand the importance of studying colloid because colloids do exist around them.

Based on the description, the researchers took the title "Chemistry Student Worksheet Oriented SETS (Environment Science Technology and Society) at the principal material for RSMABI Colloids"

Based on the above background, the problems may be brought "How the feasibility Chemistry Student Worksheet SETS oriented to the subject matter colloids RSMABI criteria in terms of content, presentation, language, graphity and compatibility with the components of SETS? "

The purpose of this study was to determine the feasibility of Chemistry Student Worksheet SETS oriented to the subject matter of colloidal RSMABI criteria developed in terms of content, presentation, language, graphity, and compatibility with the components of SETS.

METHOD

The design of the development of Chemistry Student Worksheet research on the subject matter of this colloid refers to a software development model of learning 4-D (four-D model) is suggested by Thiagarajan which consists of four phases, namely Define phase, design phase, development phase , and Disseminate phase.

The study is limited to the level of development, because the study only to determine eligibility. The design of this study can be presented as the following flow chart:

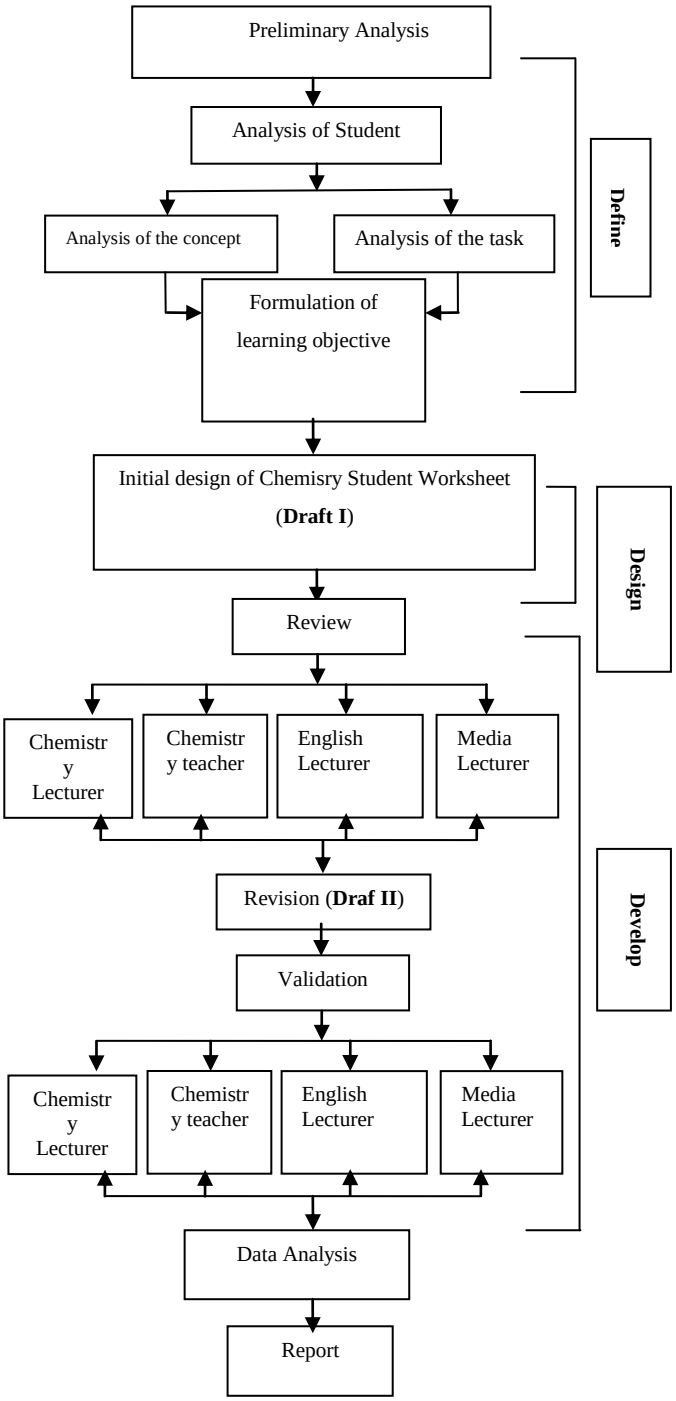

Figure 1 Modification Design Development Tools Learning Model 4-D according to Thiagarajan, Semmel and Semmel [6].

Sources of data in this study is a professor of chemistry, an English lecturer, media lecturer 2, and 3 chemistry teachers SMA Negeri 1 Pamekasan. Methods of data collection in this research using the questionnaire method. The analysis was conducted on each of the criteria related to Chemistry Student Worksheet component is the content, presentation, language, and compatibility with the components kegrafiakaan SETS. The percentage of the data obtained by questionnaire is a modification of the Likert Scale as follows:

1. much less given a score of 1.
2. less were scored 2.
3. Both were given a score of 3.
4. Very good given the score of 4 [7].

Formula used to calculate the percentage of Rating Scale as follows:

$$Percentage\ (\%) = \frac{\text{total score of data collection results}}{criteria\ score}\ x\ 100\%$$

Criteria score = the highest score x number of aspects of x number of respondents [8].

The percentages obtained are interpreted in the following criteria:

Table 1 Modified Likert Scale Interpretation Criteria Score.

Percentage (%)	Criteria
0-25	Very weak
26-50	weak
51-75	strong
76-100	Very strong

Ridwan [7]

RESULTS AND DISCUSSION

Analysis Results of Review of Chemistry Student Worksheet SETS-Oriented

Review of Chemistry Student Worksheet oriented SETS (environment science technology and society) performed by 3 expert material (2 lecturers of Chemistry, State University of Surabaya and a teacher of SMAN 1 Pamekasan), a linguist (English lecturer of Chemistry, State University of Surabaya) and a media expert (learning media lecturer of Chemistry, State University of Surabaya). From the study conducted, obtained input and advice from experts to draft a criteria that includes components of the Chemistry Student Worksheet criteria of content, presentation, language, graphity, and compatibility with the components of SETS. Study carried out by using the instrument review sheet content, presentation and kesesuain with SETS components, instrument pieces of language study, and study sheets graphity instrument. Based on the reviewers input to the draft 1 revision and produce a draft 2. Analysis of Data Validation Results of Chemistry Student Worksheet with SETS oriented.

Analysis of the data validation results of Chemistry Student Worksheet with SETS oriented on the subject matter be descriptive quantitative Colloids. Validation of the draft Chemistry Student Worksheet 2 SETS oriented pieces performed by instrument validation using content, presentation and kesesuain with SETS components, instrument pieces linguistic validation, and instrument validation graphity sheet. Sheet used to collect data validation assessment of the eligibility criteria of content, presentation, language, graphity, and compatibility with the components of the Chemistry Student Worksheet SETS developed. Validation is performed by experts (validators) to assign a value to every aspect of the content criteria, penyajain, linguistic, and kekesuaian graphity SETS with components based on the modification of the Likert Scale:

a. much less given a score of 1.
b. less were scored 2.
c. Both were given a score of 3.
d. Very good given the score of 4 [7].

According Riduwan [7], if these criteria get the appraisal with the

percentage of ≥ 51% according to modified Likert scale in Table 1, then Chemistry Student Worksheet developed is said to deserve. Validation results of Chemistry Student Worksheet with SETS oriented as below:

Table 2 Validation results-oriented SETS Chemistry Student Worksheet

Criteria Aspects	Presentation of Assessment (%)				Average (%)	Criteria
	CSW 1	CSW 2	CSW 3	CSW 4		
Contents	82.14	84.38	81.25	82.29	82.52	Very Strong
Presentation	82.50	83.75	83.75	83.75	83.44	Very Strong
Linguistic	87.50	87.50	85.00	90.00	87.50	Very Strong
Graphity	92.85	92.85	92.85	100	94.64	Very Good
Kesuaian component SETS	81.25	87.50	85.42	89.58	85.94	Very Strong

Description: CSW = Chemistry Student Worksheet

Table 2 is described based on assessment of Student Worksheet Chemistry with SETS oriented as follows:

Contents Criteria

The content is one important component that must be considered in the preparation of C hemistry Student Worksheet. According BSNP that one of the Student Worksheet eligibility criteria are criteria in terms of content. Criteria for the contents of C hemistry Student Worksheet consists of several aspects of the suitability of the material with SBC and Cambridge curriculum, the suitability of the material with the Standard of Competence and the Basic Competence to be achieved, the material relevant to the indicators of learning outcomes, materials relevant to the purpose of the study, contains a summary of material facts, laws, concepts and principles is important, the evaluation questions in Chemistry Student Worksheet easy to understand and comply with indicators of learning outcomes, and activity experiments or experiments in the Chemistry Student Worksheet in accordance with the materials and basic competence, which developed [9].

Based on the validation results are presented in Table 2 Student Worksheet Chemistry has met the eligibility SETS oriented content by percentage of worksheet 1, 2, 3, and 4 of each row of 82.14%, 84.38%, 81.25% , and 82.29%. Based on the interpretation of scores on the Likert scale modification of Table 1 it can be said that the eligibility criteria for the content of C hemistry Student Worksheet SETS are oriented in the interval 76% -100%, which means a very strong or very decent to say.

Presentation Criteria

According BSNP eligibility criteria relating to the presentation consists of several aspects of the present cover the contents of the manuscript Chemistry Student Worksheet, the suitability of the table of contents with chapter headings, subchapters, page numbers, clarity standard of competence, basic competence, and indicators of learning objectives, suitability of the concept map contains concepts core concepts to be presented, kesesuain question / problem training in each chapter [9].

Based on the validation results are presented in Table 2 Student Worksheet Chemistry has met the eligibility SETS

oriented presentation of the percentage of C hemistry Student Worksheet 1, 2, 3, and 4 of each row of 82.50%, 83.75%, 83 , 75%, and 83.75%. Based on the interpretation of the score modified Likert scale in Table 1, it can be said that the eligibility criteria for the presentation of the Student Worksheet Chemistry with SETS oriented in the interval 76% -100%, which means a very strong or very decent to say.

Language Criteria

Based on the validity of the language contained in Table 2 show that C hemistry Student Worksheet 1, 2, 3, and 4 obtained the percentage of each, amounting to 87.50%, 87.50%, 85.00% and 90.00% . Student Worksheet Chemistry has met the eligibility SETS oriented language with an average percentage of 87.50% so it can be said to include the category of very strong because it is in the interval 76% -100% in the interpretation of scores modified Likert scale in Table 1. Fulfilling the criteria of language C hemistry Student Worksheet has been in accordance with the criteria of language according BSNP abaout Chemistry Student Writing Worksheet using appropriate language to the level of student progress, Chemistry Student Worksheet Writing in English is good and right, Keruntutan ketertautan language or inter-chapters, sub chapters, paragraphs, and sentences. Chemistry Student Writing Worksheet using terms that are easily understood and Chemistry Student Writing Worksheet using the term or symbol or emblem steadily [10].

Graph Criteria

According BSNP eligibility criteria related to graph consists of several aspects of the suitability of Chemistry Student Worksheet skin leather the front, back and displayed in contrast, clear, interesting and appropriate to the magnitude and type of font and color and layout is appropriate, the suitability of the content of Chemistry Student worksheet is presented in the form of text and illustrations (images) displayed communicative and harmonious, proportionate and consistent, suitability letters in the select on of the types and large letters, illustrations or images can help the understanding of concepts, clarity of content is helping mold the students in learning, understand, and manage the information submitted, selected paper A4 100 grams with a function as printed informa ion delivery media and survive for at least 5 years, softcover binding system that has a strength of at least 5 years [9].

Based on the validation results are presented in Table 2, Chemistry Student Worksheet with SETS oriented graph meets the eligibility percentage Chemistry Student Worksheet 1, 2, 3, and 4 of each row of 92.85%, 92.85%, 92, 85%, and 100%. Based on the interpretation of scores on the Likert scale modification of Table 1 it can be said that the eligibility criteria for the presentation of the Student Worksheet Chemistry SETS oriented in the interval 76% -100%, which means a very strong or very decent to say.

Suitability Component of SETS Criteria

According Binadja eligibility criteria relating to suitability SETS component consists of several aspects: linking science with state of the environment (science and environment), linking science with technology (science and technology), connecting science to the circumstances surrounding communities (science and society) [11].

Based on the validation results are presented in Table 2, Chemistry Student Worksheet SETS oriented components has met the eligibility conformity with the percentage SETS Chemistry Student Worksheet 1, 2, 3, and 4 respectively in a row at 81.2%, 87.50%, 85.42% and 89.58%. Based on the interpretation of scores on the Likert scale modification of Table 1 it can be said that the criteria for the suitability of components for Chemistry Student Worksheet with SETS oriented at intervals of 76% -

100%, which means a very strong or very decent to say.

Overall results of the validation is based on Table 2 Student Worksheet Chemistry oriented SETS have been developed to meet the criteria of content, presentation, language, and suitability graphity SETS components respectively by 82.52%, 83.44%, 87.50%, 94, 64%, and 85.94%. Based on the interpretation of scores on the Likert scale modification of Table 1 it can be said that the Student Worksheet Chemistry with SETS oriented is fit for use in schools, especially high school stubs International Level.

CONCLUSION AND ADVISE

Based on the analysis of research data can be concluded that the Chemistry Student Worksheet with SETS Oriented (Science, Environment, Technology and Society) to Colloid for RSMABI been fit for use as a learning device because it has reached the percentage of ≥ 51% in the interpretation of the score scale modification criteria Likert. Chemistry Student Worksheet with SETS Oriented has met the eligibility criteria of content, presentation, language, and graph, and compliance components of SETS (Science, Environment, Technology and Society) respectively by 82.52%, 83.44%, 87.50 %, 94.64%, 85.94% with a very strong category.

The study only examined the feasibility of Chemistry Student Worksheet with SETS Oriented (Science, Environment, Technology and Society) so that from the findings is unknown effect of Chemistry Student Worksheet on student learning outcomes. It is therefore necessary to study more about the effect of Chemistry Student Worksheet on student learning outcomes

REFERENCES

1. Depdiknas. 2009. *Panduan Penyelenggaraan Program Rintisan SMA Bertaraf Internasional (R-SMABI)*. Jakarta: Depdiknas Direktorat PembinaanSekolah Menengah Atas.
2. Depdiknas. 2008. *Panduan Pengembangan Bahan Ajar*. Jakarta: Depdiknas Direktorat PembinaanSekolah Menengah Atas.
3. BSNP. 2006. *Panduan Penyusunan Kurikulum Tingkat Satuan Pendidikan Jenjang Pendidikan Dasar Dan Menengah*. Jakarta: Badan Standar Nasional Pendidikan.
4. BSNP. 2006. Standar Isi untuk Satuan Pendidikan Dasar Dan Menengah Standar Kompetensi Dan Kompetensi Dasar SMA/MA. Jakarta: Badan Standar Nasional Pendidikan.
5. Febri ,Ika N. A. 2010. *Pengembangan Buku Siswa Berorientasi Sets Pada Materi Pokok Perubahan Materi Dan Reaksi Kimia Kelas Vii Untuk Sekolah Bertaraf Internasional*. Skripsi. Tidak Dipublikasikan. Surabaya: Universitas Negeri Surabaya.
6. Ibrahim, Muslimin. 2002. *Pelatihan Terintegrasi Berbasis Kompetensi Guru Mata Pelajaran Biologi Pengembangan Perangkat Pembelajaran.* Surabaya: Depdiknas Direktorat Jendral Pendidikan Dasar dan Menengah.
7. Riduwan. 2010. *Skala Pengukuran Variabel- variabel Penelitian*. Bandung: Alfabeta.
8. Sugiyono. 2008. *Metode Penelitian Kuantitatif Kualitatif dan R&D.* Bandung: Alfabeta.
9. BSNP. 2006. *Instrument Penilaian Tahap II Buku Teks Pelajaran Kimia SMA/MA.* Jakarta: Badan Standar Nasional Pendidikan.
10. BSNP. 2006. *Instrument Penilaian Tahap II Buku Teks Pelajaran*

Kimia SMA/MA. Jakarta: Badan Standar Nasional Pendidikan.

11. Binadja, Achmad. 2007. *Pedoman* Pengembangan *Bahan Pembelajaran Bervisi Dan Berpendekatan SETS (Science, Environment, Technology, and Society)*. Semarang: Laboratorium SETS UNNES.